REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow. With this amendment, claims 1 and 22 have been amended, no claims have been cancelled, and claims 67-69 have been added. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier. Thus, claims 1, 10-22, 31-40, 55-69 are pending in the application. Support for new claims 67-69 can be found in previously presented claims 1 and 22 and paragraph [0047] of the specification. No new matter has been added.

Claim Rejections - 35 USC § 112

Claims 1, 10-22, 31-40, 56-57, 61-62, and 64-66 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite. Specifically, the in paragraph 3 of the Action, Examiner alleges the feature "wherein the porous membrane is a sensor exhibiting sensing characteristics causing a change in at least one of an optical and electrical characteristic in response to exposure to a targeted fluid or reaction" is unclear. The Examiner states that "[i]t is not clear what Applicant means by the phrase 'sensing characteristics'." See paragraph 3 of the Action. Applicants respectfully traverse the rejection.

The phrase "sensing characteristics" means properties to sense "a change in at least one of an optical and electrical characteristic in response to exposure to a targeted fluid or reaction" as recited in claims 1 and 23. The phrase "sensing characteristics" is clarified in the specification and needs to be viewed in the context of the specification. Paragraph [0029] of the specification states "[a]t the cross-channel area 108, a portion of the sample fluid 126b will flow through or attach to

the porous membrane 110, causing a reaction, such as a potential change in an optical and/or electrical characteristic of the porous membrane 110. Such a characteristic change may be measured in the manners described below." Examples of numerous measurement techniques and/or properties for which measurement is described follow in the specification. Examples include, but are not limited to: "The field force/gradient may an electric field, magnetic field, acoustic wave, ultrasounds, light with specific wavelengths and other fields capable of interacting with the molecules of interest" [0032], "Generally, such PSi or PPSi sensor mechanisms may include but are not limited to optical interferometric reflectivity, capacitance modulation, photoluminescence, optical form birefringence, acoustic, *etc.*" [0039], The light emitted and/or scattered may be detected such as absorption, luminescence (fluorescence and phosphorescence), vibrational (infra-red, Raman, resonance Raman, etc.), SPR (surface plasmon resonance), etc." [0041], and "In one embodiment, the optical detector 302 comprises a detector suitable for laser interferometry. Other typical optical detectors include, but are not limited to, avalanche photodiodes, various photosensors, and other devices used to measure wavelength, phase shift, and or optical energy/power." [0042]. That is, the specification teaches a large selection of "optical and electrical characteristics." Thus, "sensing characteristic" may include, for example, a change in optical interferometric reflectivity, capacitance modulation, photoluminescence, optical form birefringence, acoustic, absorption, luminescence (fluorescence and phosphorescence), vibrational (infra-red, Raman, resonance Raman, etc.), SPR (surface plasmon resonance), wavelength, phase shift, and or optical energy/power. Applicants submit that one of ordinary skill in the art reading the specification would not find the phrase "wherein the porous membrane is a sensor exhibiting

sensing characteristics causing a change in at least one of an optical and electrical characteristic in response to exposure to a targeted fluid or reaction" unclear.

The Examiner has also stated that "[i]t is not clear how the use of a semiconductor material such as silicon provides a 'sensing characteristic'." See paragraph 3 of the Action. The reason why a semiconductor material such as a porous silicon membrane provides a "sensing characteristic causing a change in at least one of an optical and electrical characteristic in response to exposure to a targeted fluid or reaction," as recited in claims 1 and 22, is that porous silicon is a material which is **both** semiconducting **and** provides luminescence. *See*, "Porous Silicon as a Biomaterial" at http://www.azom.com/details.asp?ArticleID=529 attached herewith. Hence, porous silicon itself can be either an electrical or optical sensor capable of sensing "at least one of an optical and electrical characteristic in response to exposure to a targeted fluid or reaction," as recited in claims 1 and 22.

Applicants respectfully request withdrawal of the rejection.

Claim Rejections - 35 USC § 103

Claims 1, 10-22, 31-40, 56-57,61-62, and 64-66 were rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Pub. No. 2003/0136679 to Bohn et al., in view of US Patent Pub No. 2003/0148524 to Zimmermann et al. Applicants respectfully traverse the rejection.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). *See also* MPEP 2143.03. Independent claims 1 and 22 have been amended to recite "wherein the porous membrane comprises a material which is capable of exhibiting a change in both an optical

and an electrical characteristic." This feature is neither taught nor suggested by any of the applied references.

Zimmermann teaches the carrier member can be formed of a membrane comprising polycarbonate or silicon nitride (see paragraph [0028]), Bohn teaches a membrane comprising "nuclear track etched polycarbonate film (PCTE)" (see paragraph [0026]). Bohn teaches the pores may be coated with gold (see paragraph [0028]). Neither reference teaches or suggests "wherein the porous membrane comprises a material which is capable of exhibiting a change in both an optical and an electrical characteristic." As discussed in the previous response submitted after final rejection and in more detail below, porous silicon has both semiconducting and luminescent properties. Polycarbonate (including PCTE) and silicon nitride do not. Thus, even if Zimmermann and Bohn could be combined, the result would not be claimed invention. For at least this reason, the combination of Zimmerman and Bohn would not have rendered obvious amended independent claims 1 and 22 and the claims that depend from these claims obvious to one or ordinary skill at the time of the invention. Applicants therefore respectfully request withdrawal of the rejection.

Further, in the advisory Action dated December 19, 2008, the Examiner makes the following statements:

A. Bohn includes a semiconductor material (i.e., gold) that can be used for electronics and photovoltaic applications. (Advisory, page 3, line 11)

B. Applicant argues that porous silicon and porous silicon nitride are not the same. Applicant merely asserts silicon nitride does necessarily contain elemental silicon. Clearly this is not correct based on chemical formula of silicon nitride (Si3N4), which shows elemental silicon Si. (Advisory, page 3, line 23-24).

C. Also note that Applicant teaches the porous membrane is made of a porous polydimethyl siloxane (PDMS). (Advisory, page 3, line 25).

These statements are all incorrect. Regarding statement A, gold is not a semiconductor. A semiconductor, by definition, must have a bandgap. (See attached Wikipedia entry for semiconductor). That is, a gap between the conduction band and the valence band. Gold is a metal. Metals do not have a band gap. That is, the conduction band and the valence band overlap. (See attached Wikipedia entry for metal).

Regarding statement B, the Examiner mischaracterizes Applicant's argument. Applicant agrees that silicon nitride does comprise silicon. Applicant, however, disagrees that porous silicon and silicon nitride are the same or even remotely equivalent for the claimed device. Porous silicon is a material which is produced by etching semiconducting silicon. Silicon nitride, as discussed in the previous response, is an insulating material. Diamond and graphite are chemically more similar than porous silicon and silicon nitride yet no one would confuse the two material. A claim to a device with a diamond protective coating would not be anticipated nor rendered obvious by a gear lubricated with a graphite coating. "During examination proceedings, claims are given their broadest **reasonable** interpretation **consistent with the specification**. See In re Graves, 69 F.3d 1147, 1152, 36 USPQ2d 1697, 1701 (Fed. Cir. 1995). Simply, the assertion that silicon and silicon nitride are equivalent is neither reasonable nor consistent with the specification.

Regarding statement C, Applicant does not teach that the porous membrane is made of a porous polydimethyl siloxane (PDMS). Applicant teaches that the **substrate** 702, 720 can be made of polydimethyl siloxane (PDMS). (Paragraphs [0052]-[0053]). The porous membrane comprises polysilicon which is then etched to form the porous silicon membrane 710. Thus, the Examiner's argument that the porous membrane need not be "purely silicon" is incorrect.

New Claims

New claims 67-69 include the feature, inter alia, "the porous membrane is uncoated." As acknowledged by the Examiner in the advisory the previously presented claimed were not "limited to an uncoated porous silicon membrane." (Advisory, page 3, line 5). This feature is newly presented and has not been previously examined.

In view of the above amendment, Applicants believe the pending application is in condition for allowance.

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Respectfully submitted,

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